



BLACK SEA4FISH

PRESENTATION SERIES 5

"Data limited stock assessment models"

by

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QUESTION AND ANSWER SESSION

1. Fabio FIORENTINO

"Giuseppe, could you clarify if the LBB method follows a steady state approach? How do you think we can relate to the variability among cohort in a time series?"

Giuseppe: Yes the LBB assumes a steady state.

Fabio Fiorentino: and so do you obtain an estimate of B/B_0 for each "pseudo cohort" you have processed? How can we combine these results to obtain priors for $AMSY$ or $CMSY$?

Giuseppe: Yes correct. You can use B/B_0 estimated by LBB at the beginning and end of the series in $CMSY$ and $AMSY$. However, LBB assumes fluctuations of mortality, growth, and recruitment around mean values over the range of ages in the LF sample and should not be used if this assumption is violated. For example, high interannual recruitment variability may lead to multiple peaks and poor analytical results because without additional information, length-based methods cannot determine whether the observed difference in the frequency of many small and few large individuals is caused by an unusually strong cohort of recruits or by strong removal of large fish.

2. Massimiliano CARDINALE

"I am working with Henning Winker on a benchmark of 15 different species using production models in ICES called WikiSPiCT, using SPiCT on real stocks from the ICES database. [There is an interesting paper coming out soon in ICES journal showing that SPiCT is positively biased compared to other production models.] What we discovered using these real examples is that the length of the time series is a crucial part of the results of any production model: the results can be completely different if you include historical catches or not. So the a general suggestion/recommendation to WikiSPiCT where I am the Chair and Henning is the reviewer is that, when using production models, efforts should be made to include historical catches, ideally as far back as to the start of the fishery because that is the only way to make a production model work properly. Time series that go partially back should be discouraged, even more so if they are only very recent compared to the start of the fishery. I suggest that in the Black Sea you go back to before at least the second world war. In ICES we have started to realize that we need to go back at least to 1946, but many stock assessments try to start in 1903 when industrial fishing started in ICES area and you should do the same for the Black Sea because even if the data are not exact they anchor the model to a historical level and this is fundamental for the results of production models. I recommend to do these kinds of experiments because you will find out the results are very different and you can flip a stock from underexploited to overexploited or from lightly exploited to really overexploited"

Nazli: reliable time series of catch are not always easy to find, what do you think of rebuilding catch data as this will allow you to go further back than the data available in the research institutions?

Max: I can answer what we did in ICES our time series are not really rebuilt but they are just historical landings and may not be accurate as for example they may be missing discards or may not be as accurate a recent DCF data. But, however inaccurate, they give you an idea of the levels in the past. Of course if you have 10,000 tonnes and you think real catches are likely between 0 and 100,000 tonnes then it is probably not worth using that number. They will not be accurate but will be indicative of the ballpark of what happened in the fishery back then and are fundamentally important for production models because they anchor the model to production levels of the past and even if they are 10-100 tonnes different it is not important because they provide a good idea of the trend which are especially important when calculating relative reference points which are much more affected by trends than they are by absolute numbers. Or at least you should show what the effect of using because the difference can be enormous in terms of stock status.

3. Betulla MORELLO

"We have gone through a number of methods and the general thing is that all these models are based on rather strong assumptions, including the determination of priors that can be more or less informed, and many of them are equilibrium models. In view of this, I think it is the general recommendation when using data limited assessment models to consider the outputs from the application of a number of different models and check for consistency of the outputs. I was wondering is any of you three or all of you had any suggestions or advice or comments in this respect in terms of best practice when applying data limited models in addition to what Max just pointed out?"

Giuseppe: I completely agree: when we use data poor approaches we need to look at more than one method and compare outputs of different methods as the output on one single model may be completely misleading, so you can only benefit from comparing the outputs of 3-4 different data poor

methods. But also, I would suggest that even when you have a really complex model, e.g. an SS3 model or an age-based model, I would suggest having also a data poor approach in order to compare and look for example if there are biases in the age data. So it is good practice to compare more than one method using different assumptions, in general

Naz: there are several very good papers in the past 2 years on performance metrics for data limited stock models. These papers are very useful, some are for catch-based models others are for length-based models some all. They all give an important idea of which method is most useful. For example what methods can be useful and give the best performance based on life history characteristics e.g. for very low resilience (low growth, low fecundity) species/stocks (see list below). We should not forget that the ecosystem is affected by many different dynamics and here we have discussed models that focus on fishing activities but the ecosystem has dynamics and there are many other important factors.

Max: Giuseppe opened a very important point. I would like to 1) remind that as Giuseppe says, production models can be used as important diagnostic tools for age-based models and 2) that integrated models (IM) actually were built as the bridge between production models and age-structured models. In other words, an IM works exactly as a production model as long as you don't have age inside it. This was the spirit of how they were built by the Americans in the early 2000s. IM were actually built for moderate- to data-poor situations and not for very data-rich situations, they were built for situations where very little fragmented data were available and they wanted to be bridged with catch-only data. So that's the beauty and the strength of IM: you can put together everything you have and make a sort of hybrid production model with whatever data you have, then age structure can be added.

Betulla: I think this spirit is being taken forward by Jason Cope who is trying to put together the use of SS3 to mimic models such as LB-SPR – a lot of work is being done to formalize this as well.

Max: yes it is called SimpleSS. I encourage people with production models that then all of a sudden have 2-3-4 years of size/length data to build an IM to see what the model says: they are very powerful diagnostic tools.

4. Fabio FIORENTINO

"I would like to add a warning to what Max said about the length of time series. I agree with the importance of long time series for production models but two aspects have to be considered when working with long time series in trying to understand the true productivity of the stock under investigation: 1) there should not be a regime shift in the environmental drivers that could affect productivity as this would violate the assumption that the environmental factors affecting the productivity of the stock fluctuate around a mean situation, and 2) beware of possible changes in catchability. So the rates that we obtain from examining long time series such as CPUEs can be affected by variations in q . I fully agree with the importance of long time series as well as considering data at very low levels of fishing effort (the start of a fishery) but we need to consider these other aspects."

5. Ali CEMAL GÜCÜ

"Could BlackSea4Fish project organize another seminar on Integrated Assessments preferably by Max Cardinale?"

Max: I would be honored but for end of spring.



References

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